Amendments to the Drawings:

The attached sheet(s) of drawings includes changes to Fig. 4. This sheet, which includes Figs.4A and 4B, replaces the original sheet(s) including Figs. 1-5.

Attachment: Replacement Sheet

Remarks

A substitute specification including amendments of paragraphs 31 and 32 is submitted with references to "2 pounds" have been changed in three instances to "two pounds". Applicants have also amended the specification to provide antecedent basis for all limitations of claims 3-5, 8, 9, 11-17 and 20 in response to the Examiner's objection to the specification. The limitations of those claims have been added to the detailed description of the application essentially verbatim. In as much as the claims were part of the original disclosure it is respectfully submitted that no new matter is added by these amendments.

In response to the rejections of claim 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement, because claims 1 and 2-4 recite the limitation "the rotating shaft. . .exhibits a bending mode and exhibits a breathing mode which are closely coupled". The specification at page 3 indicates the rotating shaft has a vibration characteristic that exhibits closely coupled bending modes and breathing modes. It is submitted that such a rotating shaft inherently has bending and breathing modes and that such a shaft is illustrated in the drawings.

Claim 8, lines 6-9 and claim 17, lines 6-9 each recite the limitation "an inertia ring...fixed at a specified point on the driveshaft that separates the bending mode...from the breathing mode." The Examiner objects to this as lacking enablement. It is respectfully submitted that the drawings of the application indicate the inertia ring is fixed to the driveshaft and is located at the point on the shaft where the vibrations of the shaft tend to have the greatest amplitude. The inertia ring is fixed at the bending node nearest one end of the drive shaft. The location of the bending and breathing mode is determined by vibration testing.

The Examiner also rejects claim 13 failing to provide an enabling disclosure for the limitation in claim 13 "the weight of the inertia ring is determined by finite element analysis". It is respectfully submitted that finite element analysis is a well known tool used in vibration and noise control technology and that the weight of the inertia ring is determined with

testing of the shaft design. The Examiner also rejects claim 13 for lack of enablement of the limitation "the weight of the inertia ring is determined by testing". It is respectfully submitted that tests determine that the inertia ring is determined by test procedures and in reference to Figures 6 and 7.

Claims 1-20 stand rejected under 35 U.S.C. § 112 second paragraph as being indefinite. Claims 1-7 have been amended to recite the combination of an inertia body and a rotating shaft and references to the "system" have been deleted.

The Examiner also objects to the use of the term "closely" in claim 1, line 4 as being a relative term. Applicants respond that the term closely is defined with reference to Figures 6 and 7 that illustrate a closely coupled relationship between the bending and breathing modes.

The Examiner rejects claim 5 for its use of the term "near" indicating that it renders the claim indefinite. Claim 5 has been amended to state the inertial body is attached to the rotating shaft proximate the bending vibration antinode nearest the end thereof. It is respectfully submitted that this amendment of claim 5 provides clarification of the location because it is now stated to be at the nearest end of rotating shaft.

Claim 3 is rejected to for reciting that the breathing mode is the expansion and contraction of the shaft. It is respectfully submitted that claim 3 further defines the breathing mode and is therefore sufficiently definite.

The Examiner objects to claim 4 as reciting that the bending mode is the oscillation of the shaft. It is respectfully submitted that the bending mode is further defined by claim 4 as being the oscillation of the shaft and is therefore sufficiently definite.

Applicants object to claim 8, line 9 which recites the breathing mode as being created by vibrations of the shaft while in claim 17, line 8, the breathing mode is recited as

being created by the rotation of the shaft. It is respectfully submitted that the same breathing mode is further specified by the different characteristics described. The vibration of the shaft is generally created by rotation of the driveshaft and therefore the same breathing mode is being described by different characteristics thereof that are identified in the claims.

The Examiner also rejects claims 18-20 due to the recitation of "a drivetrain connection" that was not set forth on claim 17. Applicants have amended claims 18-20 to refer to a driveshaft connection for which antecedent basis is provided in claim 17.

In response to the Examiner's rejection under 35 U.S.C. § 102 of claims 1-5, 8, 9, 12, 13 and 16-18 as being anticipated by Larsen, it is respectfully submitted that the independent claims disclose a concept that is not anticipated by the Larsen patent. The Larsen patent fails to disclose the rotating shaft that exhibits a bending mode and a breathing mode that are closely coupled but are decoupled by attaching the inertial body to the rotating shaft proximate a bending vibration antinode. Independent claims 1, 8 and 17 recite the inertia ring is fixed at a specified point on the driveshaft that separates the bending mode created by vibrations of the driveshaft from the breathing mode created by the vibration of the driveshaft. The Larsen patent does not disclose or suggest this element of the invention.

Claim 17 recites that the inertia ring is fixed at a specified point on the driveshaft that separates the bending mode created by the vibrations of the driveshaft from the breathing mode created by rotation of the driveshaft to reduce the amplitude of the resonant frequencies and limit the amount of noise emitted by the driveshaft. The Larsen patent does not disclose or suggest this concept. Applicants respectfully request that the Examiner withdraw this rejection.

Claims 1-5, 8, 9, 12, 13 and 16-18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Linn. It is respectfully submitted that the elements of the independent claims argued in view of the Larsen patent are equally applicable to the Linn patent. The Linn patent fails to disclose the claimed feature of separating the bending mode and breathing mode

by assembling an inertia ring to a desired location on the driveshaft. The Linn patent discloses the use of multiple balance rings 5 and 6 that have weights that are intended to reduce the amplitude of vibration at a critical speed. In Applicants' invention, the driveshaft is always operated below the critical speed of rotation of the driveshaft.

Claims 14 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Linn and also stand rejected as being unpatentable over Larsen. Claims 6, 7, 10, 11, 19 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Linn in view of Hornig et al. U.S. Patent No. 4,196,786. In response to the rejection under 35 U.S.C. § 103(a), Applicants state that no one has discovered that certain bending and breathing modes may be separated on a rotating shaft by means of an inexpensive lightweight ring. The ring can reduce unwanted tonal sound being amplified by the driveshaft that are excited by transmission or axle gears. Prior inertia rings have been used to balance shafts about the critical speed of the driveshaft. However, Applicants' invention is directed to use below critical speeds and does not involve balancing. Larsen uses vibration damping while Applicants use mode shifting. To solve the issue that Applicants address, only the Armitage reference appears to be directed to solving a similar problem. However, the Armitage patent suggests the solution of placing a foam liner within the shaft to reduce the sound. The Armitage device only dampens the vibrations and does not separate the bending and breathing mode by use of a ring that is attached to the outside of the driveshaft.

Applicants respectfully request reconsideration of the application in view of the above amendments to the drawings, specification and claims of the application.

Please charge the Petition for Extension of Time Fee of $120.00 and any additional fees or credit any overpayments as a result of the filing of this paper to Ford Global Technologies, LLC Deposit Account No. 06-1510.

Respectfully submitted,
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